CROTON SUAVEOLENS AND CROTON ABRUPTUS (EUPHORBIACEAE) OF WESTERN TEXAS AND NORTHERN MEXICO

MARSHALL C. JOHNSTON

The study of plants previously referred to *Croton suaveolens* Torrey (Ferguson, 1901: 43; Standley, 1923: 616) reveals that two species are involved, adding one more species to the eighteen reported for Texas (Johnston, 1959). The following key will serve to point up the differences.

Flowers monoecious (plants rarely appearing unisexual); racemes usually androgynous, and always terminal; internodes about a third as long as the mature subtending leaves, and petioles about a fourth to two-fifths as long as their blades; capsules 6-8 mm. long; seed 5.5-6.5 mm. long; stamens 14-16; staminate calyxes ca. 6 mm. across ..... *C. suaveolens* Torrey.

Flowers dioecious; staminate plants with terminal racemes; pistillate plants with axillary racemes; internodes about half as long as the mature subtending leaves; petioles about a tenth to a fifth as long as their blades; capsules 5.5-6 mm. long; seed 4.4-4.7 mm. long; stamens 9-12; staminate calyxes ca. 4 mm. across ..... *C. abruptus* M. C. Johnston.

Croton suaveolens Torrey, Bot. Mex. Bound. p. 194, 1859.

"On the Rio Grande," *Wright exs. 1804* (NY?; apparent isotypes seen; GH, US).

Low stellate-tomentose hemispheric shrubs 20-35(-50) cm. tall; taproot 4-18 mm. thick, woody, with a brown to black bark with shallow longitudinal fissures; stems many, much-branched, 1.5-8 mm. thick, the older ones glabrate with a thin fuscous minutely longitudinally fissured bark; leafy branches (yearling twigs) 1.5-3 mm. thick, 8-20 cm. long, terete, densely and shaggily pale grayish to yellowish stellate tomentose; internodes short, 0.2-1 cm. long, the leaves thus somewhat crowded toward the ends of the branches. Leaves alternate or occasionally nearly opposite (very rarely in a whorl of 3) near the base of the racemes; blades rather thick, obovate or ovate or broadly elliptical, 2.0-5.4 cm. long, 1.0-3.6 cm. broad, about twice or a little less than twice as long as broad, broadest near the middle, rounded, obtuse and apiculate or angled apically (90-120°), narrowed or rounded basally, entire marginally, densely and shaggily grayish stellate tomentose below, less densely tomentose and pale olive-green above; petioles 5-20 mm. long, stout and tomentose like the stems; stipules a little longer than the tomentum, stramineous (young) to brownish (mature), of 5-10 unequal glandular papillae each 0.2-0.5 mm. long and bearing a few stellate trichomes, arranged palmately on a thin disk ca. 0.3 mm. in diameter. Flowers monoecious; racemes terminal, generally androgynous, 1-2(-2.5) cm. long, stout, rather densely

flowered. Staminate flowers 4-12 at top of raceme; bracts 0.7-0.8 mm. long, linear, subulate, tawny, stellate-hairy with 2 glandular pinnate stipular lobes smaller than the main portion; pedicels 3-5 mm. long (to 8 mm. long says Ferguson, but Torrey says the flowers are sessile), stellate-tomentose, ascending; calyx stellate-tomentose, limb cupped, ca. 2 mm. across, the 5 sepals ovate, ca. 2 mm. long; petals tawny, thin, 5, spatulate or obovate, densely villous at least marginally and basally, slightly longer than and alternate with the sepals; glands rather small, tawny, ca. 0.2 mm. long, narrowly oblong; stamens 14-16 (Torrey says 12-14, but most plants show 16 in the field); filaments densely villous basally, mostly smooth above; center of flower raised and densely villous. Pistillate flowers 2-4 at base of raceme, often 2-3 maturing fruit on each raceme; raceme axis stout, buttressed; bracts tawny, stellate-hairy, usually 3-lobed, the lobing pinnate or appearing palmate, linear subulate, or the lateral (stipular) lobes glandular, the middle one ca. 1.2 mm. long; pedicels 1-2 mm. long, stout, apparently accrescent to 3-4 mm. long, erect; calyx stellate-tomentose, not at all accrescent, deeply 5-lobed, the sepals thick, united only at base, lanceolate or narrowly triangular acuminate, ca. 2.5 mm. long; petals reduced to mere stalked glandular papillae between the sepals; glands of the disk thin, narrow, elongate, brownish; ovary subglobose, densely stellate-tomentose; styles 3, 4-6 mm. long, bifid to the base, stellate-tomentose, the divisions slender, purplish brown and grooved adaxially. Capsules oblong to subglobose, truncate at both ends, obscurely 3-lobed apically, 6-8 mm. long, 6-8 mm. broad, usually longer than broad, densely and shaggily yellowish or whitish stellate-tomentose; columella (5-)6-7.5 mm. long, rather stout, abruptly broadened at the summit into 3 sharp projections. Seeds roundly oblong, apiculate, dorsiventrally flattened, 5.5-7 mm. long including caruncle, grayish mottled fuscous or black when fully mature, rather shiny, smooth or with microscopic roughening; caruncle reniform, whitish vesicular, 2.5 mm. wide, 1 mm. long.

In Texas these plants are known only from the immediate vicinity of Fort Davis in Jeff Davis County, from bluffs and grassy slopes of an old decomposing lava with a high sanidine content. Nine collections have been seen from that neighborhood, and numerous plants have been studied in the field there.

The Coahuilan collections are here cited: San Lorenzo canyon, 6 miles southeast of Saltillo, *E. Palmer 390*, Sept. 21-22, 1904 (US); Sierra de la Paila, *Purpus 5040*, Oct. 1910 (US); El Berrendo near Muzquiz, elev. 4000 ft., *S. S. White 1802*, July 13-16, 1939 (GH, US); 5 miles northwest of Puerto del Aire pass at the southern end of Sierra de la Encantada, *Stewart 1300*, Sept. 1, 1941 (GH); western slopes of Sierra del Carmen 10 kilometers east of Hacienda de la Encantada, *Stewart 1679*, Sept. 15, 1941 (GH); 9 kilometers south of Parras on Sierras Negras, *Stanford, Retherford & Northcroft 214*, July 3, 1941

(GH, MEXU); Sierra de la Madera, vicinity of La Cueva in Corte Blanco fork of Charretera canyon, elev. 5300-6500 ft., *I. M. Johnston 8955*, Sept. 11-15, 1941 (GH); Sierra de Santa Rosa, south of Muzquiz, *Marsh 1385*, July 14, 1938 (GH); Sierra del Pino, vicinity of La Noria, end of road from T. Armendariz north into the Sierra del Pino, *Johnston & Mueller 519*, Aug. 20-26, 1940 (GH).

Croton abruptus M. C. Johnston, new species.

Fruticulus ad 40 cm. alt., e radice terete oriens; caules 10-35 e corona crescentes; ramosissimi, ramulis frondosis subflavis, stellato-tomentosis; laminae foliorum ovatae ad elliptico-ovatas, 1-3(-4.5) cm. long., 0.5-1.5(-1.9) cm. lat., ca. 2 plo longiores quam latae, integrae, dense tomentosae, in superficie superiore minus dense; petioli 2-3(-4.5) mm. long.; stipulae 0.1 mm. long. glanduliformes; flores dioecii, staminei petaliferi, pistillati non petaliferi; racemi staminei terminales, 0.5-1 cm. long.; pistillati plerumque 2 flores habentes, 1-3 mm. long. ut videtur axillares, plerumque uno tantum ovario racemi maturescente; styli 3, usque ad basim bifidi; capsula globosa, 5.5-6 mm. long.; semen rotundo-ovatum, 4.4-4.7 mm. long. fuscum fulgens laeve; caruncula reniformis, ca. 0.8 mm. long.

Low, stellate tomentose shrubs 10-30(-40) cm. tall; taproots terete, 3-8(-13) mm. thick, occasionally branching but usually simple, slenderly napiform, with a dark brownish bark nearly smooth or with faint vertical lines; stems several to many (10-35) from the enlarged woody crown, ascending, terete, 1-3 mm. thick, 10-25(-35) cm. tall altogether, much-branched, the angles of divergence of the branches 10-40°; stems often not persistent more than one or two years and not acquiring a thick bark; oldest stems eventually with a gray to black faintly vertically fissured bark; leafy branches yellowish, densely and somewhat shaggily stellate-tomentose, the internodes a sixth to about as long as their subtending leaves. Leaves alternate; blades ovate to elliptic-ovate, 1-3(-4.5) cm. long, 0.5-1.5(-1.9) cm. wide, about twice as long as broad or a little more, widest just below the middle, apically acute or rounded, basally rounded or occasionally narrowed, marginally entire, densely and shaggily canescent stellate-tomentose below, less densely tomentose and greener above; venation pinnate, but often obscured by the tomentum, the midvein prominent beneath, the laterals 5-6 on each side diverging at angles of 40-50°; petioles stout, densely shaggily stellate-tomentose, 2-3(-4.5) mm. long, much shorter than the blades; stipules 0.1 mm. long, dark brown or black, glabrous, shiny, papillose-glandular, obtuse-pyramidal, entire, usually hidden by the trichomes. Flowers dioecious. Staminate flowers several in slender terminal racemes 0.5-1 cm. long, the axis pubescent like the stem with internodes ca. 1 mm. long; pedicels 1 mm. long or less, stellate-tomentose, subtended by triangular-ovate acute bracts less than 1 mm. long; calyxes hemispheric or broadly campanulate, whitish or yellowish stellate-tomentose, with 5 (rarely 4) triangular acute

lobes, 2 mm. from the attachment of the pedicel to the tip of the lobe, the limb comprising about half that length; petals 5 (rarely 4), narrowly oblanceolate or somewhat unguiculate, alternate with calyx lobes and reflexed between them at anthesis, 1.8-2 mm. long, hyaline, whitish; glands 5, orangish, 0.2 mm. long, oblong or rounded, opposite the calyx lobes; stamens 9-12 (usually 11 counted in the field), the filaments glabrous and strongly inflexed in bud, 1.9 mm. long; center of flower raised and densely villous. Pistillate flowers usually 2, rarely 3, in racemes 1-3 mm. long; racemes actually terminal and quickly surpassed by a branch from the axil of the subtending leaf, but appearing therefore nodal or axillary; only one flower per raceme maturing fruit; bracts simple, subulate, 0.5-1 mm. long, stellate-tomentose abaxially; pedicels absent or very short; calyx deeply 5-lobed, shaggily stellate-tomentose outside, the limb cupped, ca. 1.7-1.9 mm. across, sepals ca. 1 mm. long, not at all accrescent, acute; glands 5, opposite the sepals, narrowly elongate, purplish brown; petals absent or only the merest glandular rudiments present; ovary globose, densely and shaggily stellate-tomentose; styles 3, ca. 1.5-2 mm. long, each bifid to the base, the divisions slender, divergent, purplish-brown, grooved ventrally, stellate-tomentose dorsally at the base. Capsules globose or somewhat 3-lobed toward the summit, densely and shaggily whitish or yellowish-green stellate-tomentose, 5.5-6 mm. long, columella 3.8-4.5 mm. long. Seeds plump, rounded, ovoid, slightly compressed ventrally, grayish or fuscous mottled black, shiny, smooth or with obscure irregular low rounded tubercles microscopically, 4.4-4.7 mm. long, including the caruncle; caruncle prominent, broadly reniform, whitish vesicular, ca. 0.8 mm. long. TYPE: Presidio County, Texas, limestone hill a quarter of a mile north of Solitario Peak, in lechuguilla, lat. 29°28′ N. by 103°50′ W., alt. 4600 ft., *M. C. Johnston 3441* (pistillate), Oct. 12, 1958 (holotype, SRSC; isotypes, TEX, US, GH, et al.). The staminate paratypes, from the same locality, are *Johnston 3440* (same herbaria).

These plants do not show much restriction as far as soils are concerned, having been found on limestone, novaculite (bedded cherty rock), and basic igneous crystallines; their elevational range is about 3800 to 4800 feet; they occur in desert scrub. All the specimens seen other than the type are cited.

TEXAS. **Brewster County:** without locality other than county, *Cory 1881*, April 25, 1928 (GH); 18.5 miles south of Marathon, *Cory 6910*, Sept. 6, 1933 (GH); frequent perennials, crevices, igneous rocks, Agua Fria Mountain, alt. 4500 ft., *B. L. Turner 1323*, July 31, *1949* (SRSC, SMU, pistillate only); infrequent, protected canyon in novaculite hills 16 miles south of Marathon, alt. 3800 ft., *Warnock 6121*, June 29, 1947 (SRSC, staminate, pistillate on same sheet); frequent perennial, rocky novaculite hills, 21 miles south of Marathon, alt. 3850 ft., *Warnock*

15895, April 1, 1958 (SRSC, staminate only); novaculite hills 12 miles south of Marathon, elev. 3900 ft., abundant low shrubs, *M. C. Johnston 3605*, *3606*, *3607* (pistillate, sun and shade forms), and *3608*, *3609*, *3610* (staminate, sun and shade forms), Nov. 5, 1958 (SRSC, et al.). **Presidio County:** small, west-flowing canyon in Glen Rose limestone, northwest of Solitario Peak, lat. 29°27½′ N. by 103°51½′ W., alt. 4200-4300 ft., *M. C. Johnston 3463*, Oct. 12, 1958 (SRSC, pistillate).

CHIHUAHUA: rocky hills near Chihuahua, *Pringle 140*, May 23, 1885 (GH, US); Santa Eulalia hills about 13 miles east-southeast of Chihuahua, *Wilkinson s. n.*, July 30, 1885 (US); vicinity of Chihuahua, alt. ca. 1300 meters, *E. Palmer exs. 73 & 77*, April 8-27, 1908 (GH, US); vicinity of Chihuahua, alt. ca. 1300 meters, *E. Palmer exs. 368*, June 5-10, 1908 (GH, US); Sierra Azul (Sierra Mapula) ca. 15 miles south-southeast of Chihuahua, shrub at base of cliff, elev. 1600-1700 meters, *F. W. Pennell 18664*, Sept. 10, 1934 (US, PH, MEXU).

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DATES OF PUBLICATION OF GÄRTNER'S DE FRUCTIBUS ET SEMINIBUS PLANTARUM

GEORGE K. BRIZICKY

Despite extensive research in botanical bibliography, there are still many works, the exact publication dates of which are doubtful. Among these works is Gärtner's *De fructibus et seminibus plantarum*. Below are some notes which it is hoped will clarify the dates of appearance of this important taxonomic reference.

Pritzel (Thesaurus lit. bot. ed. 2. p. 116. 1872) cites the two volumes of Gärtner's work as appearing in 1788 and